IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Group Art Unit 2837

In re

Patent Application of

William Louis Mehlhorn, et al.

Application No. 10/789,314

Confirmation No. 9215

Filed: February 27, 2004

Examiner: Smith, Tyrone W.

"MULTIPLE-SPEED ELECTRIC MACHINE AND METHOD OF OPERATING THE SAME"

COMMENTS ON STATEMENT OF REASONS FOR ALLOWANCE

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This communication is in response to the Examiner's statement of reasons for allowance of the claims, contained within the Notice of Allowance and Fee(s) Due mailed January 18, 2006. The Examiner may have generalized some of the features of independent claims 1, 9, 12, 15, 17, and 18; and did not discuss the dependent claims. Therefore, the reasons set forth by the Examiner are not the only reasons claims 1-3, 7-9, 12-18, and 20-27 are allowable. Each of claims 1-3, 7-9, 12-18, and 20-27 may include additional patentable features or combinations of features not mentioned by the Examiner.

Applicants assert, with respect to independent claim 1, the prior art does not teach or suggest a method of controlling an electric machine, the electric machine comprising a rotor and a stator, the method comprising:

providing an electric machine comprising

a first speed circuit comprising a first main winding, an auxiliary winding, and a switch connected in series with the auxiliary winding, and

a second speed circuit comprising a second main winding;

providing an operational power to one of the first speed circuit and the second speed circuit;

detecting which of the first speed circuit and the second speed circuit is receiving the operational power,

wherein detecting which of the first speed circuit and the second speed circuit is receiving the operational power comprises at least one of detecting an existence of the operational power, and detecting an absence of the operational power, and

wherein detecting an existence of the operational power comprises detecting at least one of a current associated with the operational power, a voltage associated with the operational power, and a frequency associated with the operational power; and

controlling the switch to limit current through the auxiliary winding based at least in part on the provision of the operational power to the second speed circuit.

Dependent claims 2, 3, 7, 8, and 21-27 ultimately depend from claim 1. Accordingly, each of claims 2, 3, 7, 8, and 21-27 is believed to be allowable based upon claim 1 and upon other features recited in claims 2, 3, 7, 8, and 21-27, but not discussed herein.

Applicants assert, with respect to independent claim 9, the prior art does not teach or suggest an electric machine assembly comprising:

a shaft;

a rotor connected to the shaft for rotation with the shaft;

a first speed circuit comprising a first main circuit, a first auxiliary circuit, and a switch connected in series with the first auxiliary circuit, wherein the first speed circuit is of a

permanent split capacitor design, the first speed circuit being configured to cause the rotor and shaft to rotate at a first speed when an operational power is provided to the first speed circuit;

a second speed circuit comprising a second main circuit and a second auxiliary circuit, wherein the second speed circuit is of a permanent split capacitor design, the second speed circuit being configured to cause the rotor and shaft to rotate at a second speed when an operational power is provided to the second speed circuit; and

a controller comprising a current sensor coupled in circuit with the first speed circuit to sense a current of the first speed circuit, the controller being configured to control operation of the switch based at least in part on whether an operational power is provided to the first speed circuit or the second speed circuit, the controller controlling the switch to limit current through the switch when the second speed circuit receives the operational power, wherein controlling operation of the switch based at least in part on whether an operational power is provided to the first speed circuit or the second speed circuit is based at least in part on an output of the current sensor.

Dependent claims 13 and 14 ultimately depend from claim 9. Accordingly, each of claims 13 and 14 is believed to be allowable based upon claim 9 and upon other features recited in claims 13 and 14, but not discussed herein.

Applicants assert, with respect to independent claim 12, the prior art does not teach or suggest an electric machine comprising:

a shaft;

a rotor connected to the shaft for rotation with the shaft;

a first speed circuit comprising a first main circuit, a first auxiliary circuit, and a switch connected in series with the first auxiliary circuit, wherein the first speed circuit is of a permanent split capacitor design, the first speed circuit being configured to cause the rotor and shaft to rotate at a first speed when an operational power is provided to the first speed circuit;

a second speed circuit comprising a second main circuit and a second auxiliary circuit, wherein the second speed circuit is of a permanent split capacitor design, the second speed circuit being configured to cause the rotor and shaft to rotate at a second speed when an operational power is provided to the second speed circuit;

a controller configured to control operation of the switch based at least in part on whether an operational power is provided to the first speed circuit or the second speed circuit, the controller controlling the switch to limit current through the switch when the second speed circuit receives the operational power; and

wherein the controller comprises a direct current power supply and a startup lockout circuit, and wherein the startup lockout circuit is configured to prevent the controller from controlling operation of the switch until the direct current power supply is adequately charged to power components of the controller.

Applicants assert, with respect to independent claim 15, the prior art does not teach or suggest an electric machine comprising:

a shaft;

a rotor connected to the shaft for rotation with the shaft;

a first speed circuit comprising a first main circuit, a first auxiliary circuit, and a switch connected in series with the first auxiliary circuit, wherein the first speed circuit is of a permanent split capacitor design, the first speed circuit being configured to cause the rotor and shaft to rotate at a first speed when an operational power is provided to the first speed circuit;

a second speed circuit comprising a second main circuit and a second auxiliary circuit, wherein the second speed circuit is of a permanent split capacitor design, the second speed circuit being configured to cause the rotor and shaft to rotate at a second speed when an operational power is provided to the second speed circuit;

a controller configured to control operation of the switch based at least in part on whether an operational power is provided to the first speed circuit or the second speed circuit, the controller controlling the switch to limit current through the switch when the second speed circuit receives the operational power;

wherein the switch comprises a solid-state switch, and wherein the controller utilizes gating pulses to control operation of the solid-state switch; and

wherein the controller comprises a voltage sense circuit configured to sense a voltage across the solid-state switch and generate an output indicative of when the solid-state switch has turned off, and wherein the output is utilized to generate the gating pulses.

Dependent claim 16 ultimately depends from claim 15. Accordingly, claim 16 is believed to be allowable based upon claim 15 and upon other features recited in claim 16, but not discussed herein.

Applicants assert, with respect to independent claim 17, the prior art does not teach or suggest an electric machine comprising:

a shaft;

a rotor connected to the shaft for rotation with the shaft;

a first speed circuit comprising a first main circuit, a first auxiliary circuit, and a switch connected in series with the first auxiliary circuit, the first speed circuit being configured to cause the rotor and shaft to rotate at a first speed when an operational power is provided to the first speed circuit;

a second speed circuit comprising a second main circuit and a second auxiliary circuit, the second speed circuit being configured to cause the rotor and shaft to rotate at a second speed when an operational power is provided to the second speed circuit;

a controller configured to control operation of the switch based at least in part on whether an operational power is provided to the first speed circuit or the second speed circuit, the controller controlling the switch to limit current through the switch when the second speed circuit receives the operational power; and

wherein the controller comprises a plurality of logic gates utilized to control operation of the switch based at least in part on at least one of detection of a direct current power level, detection of a peak current, generation of a control signal to turn on the switch, and detection of an inception of voltage after a zero-crossing of the voltage across the switch.

Applicants assert, with respect to independent claim 18, the prior art does not teach or suggest a method of controlling an electric machine, the electric machine comprising a rotor and a stator, the method comprising:

providing an electric machine comprising

a first speed circuit of a permanent split capacitor design, the first speed circuit comprising

a first main circuit comprising a first main winding,

a first auxiliary circuit comprising a first phase winding and a first capacitor connected in series with the first phase winding, and

a solid-state switch connected in series with the auxiliary circuit,

a second speed circuit of a permanent split capacitor design, the second speed circuit comprising

a second main circuit comprising a second main winding, and

a second auxiliary circuit comprising a second phase winding and a second capacitor connected in series with the second phase winding,

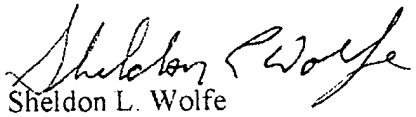
providing an operational power to one of the first speed circuit and the second speed circuit;

detecting a peak current of the first speed circuit to determine whether the first speed circuit or the second speed circuit is receiving the operational power;

controlling the solid-state switch to allow current through the auxiliary winding based at least in part on the provision of the operational power to the first speed circuit.

Dependent claim 20 ultimately depends from claim 18. Accordingly, claim 20 is believed to be allowable based upon claim 18 and upon other features recited in claim 18, but not discussed herein.

Respectfully submitted,



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